J-CORES

Database Synchronizer Administration Manual

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NTT DATA CCS CORPORATION

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Appendix B Updating rules of selectees, their statuses and data categories
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1. Introduction

This document describes settings and operations of J-CORES Database Synchronizer.

Database Synchronizer has been designed for merging/splitting data stored in J-CORES databases. Database Synchronizer is based on the following postulate:

a. “Merging” is that a part (or all) of data in a slave database are integrated into the master database of J-CORES.
b. “Splitting” is that a part (or all) of data in the master database are duplicated to a slave database.
c. The master database is the only database, into which all of J-CORES data are integrated.
d. Some slave databases are deployed onshore, and some are offshore (or on vessel).
e. “Merging” and “splitting” are executed only between the master database and a slave database, and are not executed between slave databases.

User interfaces of Database Synchronizer are as follows:

- `jcores-dbsync-merge2master`	The command to merge
- `jcores-dbsync-split2slave`	The command to split
- `jcores-dbsync-cleanup`	The command to cleanup user lock statuses and sessions on databases. This command may be used when merging (or splitting) processes failed.
- `jcores-dbsync-pgen.sh`	A command to generate a password for an Oracle user

2. Basic behavior

2.1. Rules to update data

The rules to update data are depending on data categories, as follows:

Table 2-1 Data categories

			split		merge	
			updating rule	**when conflicting**	**updating rule**	**when conflicting**
A. expedition data	**A1.** expedition data, edited only on single DB	**A1a.** expedition data, expedition indistinguishable	union	act on the parameter, "--masterdb-overwrites-conflict" or "--slavedb-overwrites-conflict" or "--error-on-conflict"	union	act on the parameter, "--masterdb-overwrites-conflict" or "--slavedb-overwrites-conflict" or "--error-on-conflict"
		A1b. expedition data, expedition distinguishable(*1)	overwrite(*2)	overwrite	overwrite(*2)	overwrite
		A1b1. expedition data, VCD selectee excluding basic and defunct on master DB(*3)	overwrite(*2) , adjusting the sort key order (local selectees follow basic selectees, and the orders among local selectees should not be changed.)	overwrite(*2), adjusting the sort key order (local selectees follow basic selectees, and the orders among local selectees should not be changed.)	overwrite(*2), adjusting the sort key order (local selectees follow basic selectees, and the orders among local selectees should not be changed.)	overwrite(*2), adjusting the sort key order (local selectees follow basic selectees, and the orders among local selectees should not be changed.)
	A2. expedition, site, hole, core data and curatorial material data	**A2a.** expedition, site, hole and core data	union	act on the parameter, "--masterdb-overwrites-expsiteholecore-of-expeditions" or "--slavedb-overwrites-expsiteholecore-of-expeditions" or "--error-on-expsiteholecore-conflict-of-expeditions"	union	act on the parameter, "--masterdb-overwrites-expsiteholecore-of-expeditions" or "--slavedb-overwrites-expsiteholecore-of-expeditions" or "--error-on-expsiteholecore-conflict-of-expeditions"
		A2b. curatorial material data	union	act on the parameter, "--masterdb-repositories" or "--slavedb-repositories" (*4,*5)	union	act on the parameter, "--masterdb-repositories" or "--slavedb-repositories" (*4,*5)
B. master data	**B1.** master data, editable only on master DB(*3)		overwrite	overwrite	-	error
	B2. master data, editable on slave DB(*1)		union	act on the parameter, "--masterdb-overwrites-conflict" or "--slavedb-overwrites-conflict" or "--error-on-conflict"	union	act on the parameter, "--masterdb-overwrites-conflict" or "--slavedb-overwrites-conflict" or "--error-on-conflict"
		B2a. master data, sequence current value	overwrite only records having the master database location(*6)	overwrite only records having the master database location(*6)	overwrite only records having the slave database location(*6)	overwrite only records having the slave database location(*6)

	split		merge	
	updating rule	when conflicting	updating rule	when conflicting
C. temporary data	-	-	-	-

*1 : Roles' categories differ by whether they belong to an expedition as below:

The roles belonging to an expedition A1b

The roles not belonging to an expedition B2

The roles not belonging to an expedition are:

- developer
- user administrator
- VCD selectee administrator

The other roles belong to an expedition.

*2 : When not specifying expeditions to process, data in this category will not be merged (or not to be split).

*3 : Selectees' categories differ by their statuses. Refer to Appendix B for details.

*4 : If each conflicting data has different repository, a conflicting error occurs.

The overwriting rules for conflicting section data are depended on repository values of section halves belonging to the section. Details are as below.

(1) When repository values of archive halves and working halves are same, the section data stored in the database which has a control of the repository overwrites the other. (Example 1)

(2) A case that repository values of archive halves and working halves are different.

(a) A case that combinations of `SECTION_HALVES.REPOSITORY` for the section halves are same between the master database and the slave database. (Example 2)

- About records of the following tables; a case of conflicting, or a case that a record stored in only one database.

  `SECTION`

  `SECTION_COMMENT`

  `SUBSECTION`

  `SECT_EXPAND_CONTRACT`

  (i) When one database has controls of both repositories of archive halves and working halves, the record stored in the database which has controls overwrites the other. (Example 3)

  (ii) When different databases have each control of repositories of archive halves and working halves, a conflicting error occurs. (Example 4)

- About records of the following tables; a case of conflicting, or a case that a record stored in only one database.

SECT_HALF_COMMENT

SECT_HALF_EXPAND_CONTRACT

The record stored in the database which has a control of its section half repository overwrites the other.

(b) When combinations of SECTION_HALVES.REPOSITORY for the section halves are different between the master database and the slave database, a conflicting error occurs. (Example 5)

Example 1;

	Master database	Slave database
Archive half repository	CKY	CKY
Working half repository	CKY	CKY

Example 2;

	Master database	Slave database
Archive half repository	KCC	KCC
Working half repository	CKY	CKY

Example 3; on the example 2, the master database has both controls of KCC and CKY.

Example 4; on example 2, the master database has a control of KCC, and the slave database has a control of CKY.

Example 5;

	Master database	Slave database
Archive half repository	KCC	CKY
Working half repository	CKY	CKY

*5 : Kinds of sample (core sample or miscellaneous material sample) is also obeyed this option, even if their attributes are managed in different tables (CORE_SAMPLE or LOGGING_SAMPLE).

*6 : The rules for the tables, SEQ_MANAGE and SEQ_NUMBER are as below:

- Records of these tables shall have one to one relations each other.
- Records of these tables are categorized as B1, excluding SEQ_NUMBER.SEQ_CURRVAL categorized as C.
- The value of SEQ_CURRVAL will be the greater value comparing records with same SEQ_ID. The same SEQ_ID means the records' LOCATION_CODE, TABLE_NAME, and COLUMN_NAME in SEQ_MANAGE are same. To make this decision, the value of LOCATION_CODE is not considered.

For the lists of database tables, columns, or records belonging to each category, refer to Appendix A.

Some data consist of one parent record and some children records. In this case, the updating rule of the children records accords with their parent record updating. For example, when A record and B record are conflicting and A is overwritten by B, children records of A would be overwritten by children records of B. By way of exception, updating rules of roles differ by their categories as below:

Roles categorized A1b:	overwrite each scientist
Roles categorized B2:	union each scientist record

2.2. Operation mode, dry-run/go-live

Database Synchronizer employs two operation modes, called "`dry-run`", which does not update J-CORES database, and "`go-live`", which updates J-CORES database. User can check the results of merging or splitting by "`dry-run`" mode without updating the database.

To check errors and results, executing in the dry-run mode before synchronization in the go-live mode is strongly recommended.

2.3. Behaviors on errors

There are three types of errors: parameter error, runtime error, logical error.

The behavior on an error is depended on the current operational mode as blow:

Table 2-2 Behaviors on errors

	dry-run mode	go-live mode
Parameter error	Stop processing. No updating has done.	
Logical error	Continue processing to detect of all logical errors.	Stop processing. And all updating is canceled, i.e. database is not updated.
Runtime error	Stop processing, excepting some errors. And when stopping process in the go-live mode, all updating is cancelled. Refer to Appendix D for behavior on each error.	

For the list of errors and their details, refer to Appendix D

2.4. Access restriction

Database Synchronizer connects to the databases as the user "`jcores`." To avoid parallel execution of synchronization, when another session of jcores existed on the databases, Database Synchronizer would stop processing.
And no editing shall be done to neither the databases during merging (or splitting.) For safety, Database Synchronizer locks the other users, and closes existent sessions forcibly.
At the end of merge/split processes, Database Synchronizer unlocks users. But in some cases of unexpected runtime errors, users might remain in locked statuses. And also jcores session used by Database Synchronizer might remain. Although Database Synchronizer would try to reconnect to unlock users on the database, if a database session had closed, locked status and the database session might still remain. In this case, by executing the cleanup command, the users would be unlocked and the remained jcores session would be closed.
When an error message prompting to execute the cleanup command is displayed, execute the command.

2.5. Treatment of Oracle user integration

Although Oracle user may be needed to shift to another database with J-CORES user data shifts, there are two problems.
One is that Database Synchronizer can't access passwords of Oracle users. To resolve this problem, Database Synchronizer employs a function to get password of each user from specified external program. The external program should be specified as an option value. A possible external program is jcores-dbsync-pgen.sh.
Another one is that Database Synchronizer can't recognize Oracle user name suffix for J-CORES users (e.g. A J-CORES user named "xxx" has the name "xxx#2Z" as an Oracle user.) To resolve this problem, Database Synchronizer requires specifying the Oracle user name suffix as an option value. And at the end of processing, Database Synchronizer deletes Oracle users whose names end with the specified suffix and who do not exist in the `SCIENTIST` table.

3. J-CORES operational constraints

Database Synchronizer performs on the premised J-CORES operational constraints, which are described in the following documents.

- Operational Manual, 4.9. Synchronizing databases
- The user manual of VCD Selectee Administrator, 2. Operational Restrictions
- The user manual of Operation, 2. Operational Restrictions
- The user manual of Curation, 2. Operational Restrictions
- The user manual of User, 2. Operational Restrictions

4. Operational Example

Some operational examples are described in Appendix C. Those examples are based on a premised scenario.

Merging can be executed after finishing an expedition and during the expedition repeatedly. And splitting can be executed before starting an expedition and during the expedition repeatedly.

5. How to use

5.1. Requirement

Environmental requirements for Database Synchronizer are as follows:

- Database Synchronizer runs on a UNIX machine with JRE 7 and Bash.
- Database Synchronizer requires direct network connections to the master database and to the slave database to merge or to split. And the speeds of the network connections shall be as fast as a connection inside LAN.
- The slave database shall be a J-CORES database instance and have all object needed (table spaces, roles, tables, indexes, triggers, synonyms, "jcores" user, and master data.)

5.2. Installing Database Synchronizer

Installing steps are as follows:

1. Make one directory to install. And deploy program files and a library file in the directory as below:

```
install_directory/
        jcores-dbsync-merge2master
        jcores-dbsync-split2slave
        jcores-dbsync-cleanup
        classes/
                jcores-dbsync.jar
                ojdbc6.jar (*)
        properties/
                dbsync.properties
```

   * The library, ojdbc6.jar can be downloaded from the site of Oracle. (http://www.oracle.com/technology/index.html)

2. Make sure that command shell files have execute permissions.
3. Deploy the file, jcores-dbsync-pgen.sh in any directory you want.
4. Each command can be executed from any directories. If necessary, add the directory where command files are deployed in to your path.

5.3. Usage of the merge command and the split command

Variables are underlined.

5.3.1. Synopses

(1) Synopsis of the merge command

To run merge processes:

```
jcores-dbsync-merge2master [--expeditions-to-merge expedition[,..]]
[--masterdb-repositories repository[,..] ]--slavedb
-repositories-all-the-others | --masterdb-repositories-all-the-others[ --
slavedb-repositories repository[,..]]
[--masterdb-overwrites-conflict | --slavedb-overwrites-conflict |
--error-on-conflict]
[[--masterdb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--slavedb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--error-on-expsiteholecore-conflict-of-expeditions-all-the-others]] |
[[--masterdb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--slavedb-overwrites-expsiteholecore-of-expeditions-all-the-others]
[--error-on-expsiteholecore-conflict-of-expeditions expedition[,..]]] |
[[--masterdb-overwrites-expsiteholecore-of-expeditions-all-the-others]
[--slavedb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--error-on-expsiteholecore-conflict-of-expeditions expedition[,..]]]
--masterdb-connection
password-for-user-jcores@hostname-or-ip-address:port:instance
--slavedb-connection
password-for-user-jcores@hostname-or-ip-address:port:instance
[--go-live | --dry-run]
--masterdb-loginid-suffix suffix
--password-generator passwd-generator-command-with-option
[--java java-command]
[--option-file file-name]
```

To see the synopsis:

```
jcores-dbsync-merge2master --help
```

(2) Synopsis of the split command

To run split processes:

```
jcores-dbsync-split2slave  [--expeditions-to-split expedition[,..]]
[--masterdb-repositories repository[,..] ]--slavedb
-repositories-all-the-others | --masterdb-repositories-all-the-others[ --
slavedb-repositories repository[,..]]
[--masterdb-overwrites-conflict | --slavedb-overwrites-conflict |
--error-on-conflict]
[[--masterdb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--slavedb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--error-on-expsiteholecore-conflict-of-expeditions-all-the-others]] |
[[--masterdb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--slavedb-overwrites-expsiteholecore-of-expeditions-all-the-others]
[--error-on-expsiteholecore-conflict-of-expeditions expedition[,..]]] |
[[--masterdb-overwrites-expsiteholecore-of-expeditions-all-the-others]
[--slavedb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--error-on-expsiteholecore-conflict-of-expeditions expedition[,..]]]
--masterdb-connection
password-for-user-jcores@hostname-or-ip-address:port:instance
--slavedb-connection
password-for-user-jcores@hostname-or-ip-address:port:instance
[--go-live | --dry-run]
-- slavedb-loginid-suffix suffix
--password-generator passwd-generator-command-with-option
[--java java-command]
[--option-file file-name]
```

To see the synopsis:

```
jcores-dbsync-split2slave --help
```

5.3.2. Options

(1) Note

The notes when specifying an option are as follows.

a. The options, `--java`, `--help`, and `--option-file` can be specified only on command line. The other options can be specified both on command line and in an

option file. There is no difference arising from a specification way.

b. The options can be specified in random order.
c. Specifying wrong options makes a parameter error. (e.g. same options specified more than once, undefined option, arguments for an option.)
d. When specifying more than one variable, they must be listed separating by a comma without a space.
e. The option suffix, "`-all-the-others`", means "all of the values excluding the values which are specified as arguments for the other options of the same category." For example, "`--masterdb-repositories-all-the-others --slavedb-repositories CKY`" means the repositories which are controlled by the master database are all of the repositories stored in databases excluding CKY.
f. When specifying options and their arguments on command line, you have to quote a string to pass to the command correctly via your login-shell, if necessary. For example, Bash considers '#' is the beginning character of a comment. Therefore when you would like to specify a string with '#', you need to quote the word. Refer to your login-shell manual for details of its quote rules. Some examples for Bash are below.

   Example 1: Specifying "`#z2`" as an argument for "`--masterdb-loginid-suffix`" option

   ```
   --masterdb-loginid-suffix "#z2"
   ```

   Example 2: Specifying the password generator command and its option as an argument for "`--password-generator`" option

   ```
   --password-generator "./jcores-dbsync-pgen.sh --suffix \"abc\""
   ```

g. When specifying options and their arguments in an option file, you should accord to the rules below:
   - The character '#' is not considered as a comment, i.e. a quotation for the character, '#' is not needed and has no influence.
   - Specifying a string with blanks, you have to quote it.
   - Specifying a quoted string within quotation marks, you have to use another quotation mark or to escape them using '\.' The character '\' is always considered as the escape character.

   Example 1: Specifying "`#z2`" as an argument for "`--masterdb-loginid-suffix`" option

   ```
   --masterdb-loginid-suffix #z2
   ```

   Example 2: Specifying the password generator command and its option as an argument for "`--password-generator`" option

```
--password-generator "./jcores-dbsync-pgen.sh --suffix \"abc\""
```

(2) Option List for the merge command

```
[--expeditions-to-merge expedition[,..]]
```

Specify expeditions to process. In the A1b data, only the records belonging to specified expeditions will be processed. By default, Database Synchronizer will merge no expedition data categorized A1b.

```
[--masterdb-repositories repository[,..] ]--slavedb
-repositories-all-the-others | --masterdb-repositories-all-the-others[ --
slavedb-repositories repository[,..]]
```

Specify repositories of which master database and/or slave database have controls. In the A2b data, the record stored in the database which has control of its repository will overwrite the other when conflicting.

```
[--masterdb-overwrites-conflict | --slavedb-overwrites-conflict |
--error-on-conflict]
```

Specify the behavior when records in the A1a and B2 excluding B2a categories conflict. The default is the option, `--error-on-conflict`, which means all conflicts cause errors.

```
[[--masterdb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--slavedb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--error-on-expsiteholecore-conflict-of-expeditions-all-the-others]] |
[[--masterdb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--slavedb-overwrites-expsiteholecore-of-expeditions-all-the-others]
[--error-on-expsiteholecore-conflict-of-expeditions expedition[,..]]] |
[[--masterdb-overwrites-expsiteholecore-of-expeditions-all-the-others]
[--slavedb-overwrites-expsiteholecore-of-expeditions expedition[,..]]
[--error-on-expsiteholecore-conflict-of-expeditions expedition[,..]]]
```

Specify which database has controls of what expeditions, for the A2a data. In the A2a data, the record stored in the database which has control of its expedition will overwrite the other when conflicting. By default, conflicts of the A2a data belonging to unspecified expeditions as arguments for the option of the master database and the slave database, (if no option, belonging to all expeditions) will cause logical errors, as same as specifying the option, `--error-on-expsiteholecore-conflict-of-expeditions-all-the-others`.

--masterdb-connection
password-for-user-jcores@hostname-or-ip-address:port:instance
Specify the information to connect the master database.

--slavedb-connection
password-for-user-jcores@hostname-or-ip-address:port:instance
Specify the information to connect the slave database to be processed.

[--go-live | --dry-run]
Specify the operational mode. For details of operational modes, refer to the chapter 2.1. The default is the dry-run mode.

--masterdb-loginid-suffix suffix
Specify the Oracle user id suffix of the master database to use when creating users. Refer to the chapter 2.5 for the details of the suffix.

--password-generator passwd-generator-command-with-option
Specify the password generator with its option. When creating an Oracle user, Database Synchronizer will call specified command with the specified option and his/her Oracle user id. The user id is added as the last argument for the command. You specify the command in an absolute path or in a relative path, or configure the environmental variable, PATH, as you can call the command from any directories.
For the usage of the password generator of version 1.3, refer to the chapter 5.5.2(2).

[--java java-command]
Specify the java command to use to execute Database Synchronizer. Its version must be 1.7. By default, the java command found on user path will be used.
This option can be specified only as a command line option. Do not include in an option file.

[--option-file file-name]
Specify a file containing options. By default, Database Synchronizer seeks no option file.
This option can be specified only as a command line option. Do not include in an option file.

[--help]
Display the usage of the command. When specifying this option, all of the rest options are ignored.
This option can be specified only as a command line option. Do not include in an option file.

(3) Option List for the split command

The options for the split command are almost same as the merge command, excluding the options, `--expeditions-to-merge`, `--masterdb-loginid-suffix`. Instead of them, the split command supports options below:

`[--expeditions-to-split expedition[,..]]`

Specify expeditions to process. In the A1b data, only the records belonging to specified expeditions will be processed. By default, Database Synchronizer will split no expedition data categorized A1b.

`--slavedb-loginid-suffix suffix`

Specify the Oracle user id suffix of the slave database to use when creating users.

5.3.3. Return codes

The merge command and the split command return a code after processing. The meanings of the codes are below:

Table 5-1 Return codes of the merge / split command

Status	Code	Situation
Success	0	Succeeded. No error has occurred.
Failed to start java command	1	Can't find jar file for command execution, jar file was destroyed, or illegal CLASSPATH, etc.
Some errors have occurred.	11	Some runtime errors or logical errors have occurred while processing.
Can't find java command	20	Specified java command is not found, or installed directory is not included in PATH, etc.
Command format error	21	Required option was not specified, illegal command format, or unexpected option was specified, etc.
Can't lock the other users	30	Can't lock the other users at the master database or/and the slave database.
Another Synchronizer might be running	31	The user for this system, jcores has been logging in already. To avoid collisions, the synchronizer doesn't run when another jcores session exists.
Logical error	40	A logical error has occurred.
Runtime error	99	Serious runtime error has occurred.

5.3.4. Update statistical information on the database

Database synchronizer executes many insert/update/delete SQL to the merged/spited database. This may decrease database performance, even if the database synchronizer has run as dry-run mode. This decrease performance may be invoked by mismatching between the preliminarily acquired statistical information of the database and current state of the database. To resolve to this issue and to improve performance again, the statistical information must update to current state. Updating statistical information takes while minutes. Here is operation example with SQLplus.

```
SQL> conn / as sysdba
SQL>  BEGIN
  2       DBMS_STATS.GATHER_DATABASE_STATS (options=> 'GATHER AUTO');
  3   END;
  4   /

PL/SQL procedure successfully completed.
```

5.3.5. Execution samples

These are examples of executing the merge command. (1) is an example of specifying options both on a command line and in an option file. (2) is an example of specifying options only on a command line. Executions these examples save the standard output of the command as a file, merge_315_316_out.txt, and the standard error output as a file, merge_315_316_err.txt. Both examples are for Bash.

(1) Using an option file

[Executing the command on a command line]

```
./jcores-dbsync-merge2master --option-file merge_opt.txt \
--java /usr/java/jdk1.7.0_25/bin/java \
--expeditions-to-merge 315,316 \
1>merge_315_316_out.txt 2> merge_315_316_err.txt
```

[Option file]

```
--masterdb-repositories-all-the-others
--slavedb-repositories CKY
--slavedb-overwrites-conflict
--masterdb-overwrites-expsiteholecore-of-expeditions-all-the-others
```

```
--slavedb-overwrites-expsiteholecore-of-expeditions 315,316
--masterdb-connection jcores_passwd@dbserver.sample.domain:1521:masterdb
--slavedb-connection jcores_passwd@dbserver.sample.domain:1521:slavedb
--masterdb-loginid-suffix #z2
--password-generator "./jcores-dbsync-pgen.sh --suffix aa"
```

(2) Specifying all options as command line options

[Executing the command on a command line]

```
./jcores-dbsync-merge2master --java /usr/java/jdk1.7.0_25/bin/java \
--expeditions-to-merge 315,316 \
--masterdb-repositories-all-the-others \
--slavedb-repositories CKY \
--slavedb-overwrites-conflict \
--masterdb-overwrites-expsiteholecore-of-expeditions-all-the-others \
--slavedb-overwrites-expsiteholecore-of-expeditions 315,316 \
--masterdb-connection jcores_passwd@dbserver.sample.domain:1521:masterdb \
--slavedb-connection jcores_passwd@dbserver.sample.domain:1521:slavedb \
--masterdb-loginid-suffix “#z2” \
--password-generator "./jcores-dbsync-pgen.sh --suffix aa" \
1>merge_315_316_out.txt 2> merge_315_316_err.txt
```

5.4. Checking messages of the merge/split command

(1) Confirming the option evaluation

Database Synchronizer outputs evaluated options to the standard output. An example is below:

```
--expeditions-to-merge 315,316
--masterdb-repositories-all-the-others BCR,ECR,KCC,SHIP,OUT,GCR,WCR
--slavedb-repositories CKY
--slavedb-overwrites-conflict
--masterdb-overwrites-expsiteholecore-of-expeditions-all-the-others
116,117,115,195,194,196,191,190,193,118,119,87,125,126,127,128,121,122,12
3,124,22,23,24,25,26,27,28,29,30,6,31,120,134,135,132,59,133,58,57,56,19,
314,179,18,176,21,131,60,90,187,189,180,182,183,184,185,186,902,901
--slavedb-overwrites-expsiteholecore-of-expeditions 315,316
```

```
--error-on-expsiteholecore-conflict-of-expeditions (none)
--masterdb-connection dbserver.sample.domain:1521:masterdb
--slavedb-connection dbserver.sample.domain:1521:slavedb
--dry-run
--masterdb-loginid-suffix #z2
--password-generator ./jcores-dbsync-pgen.sh --suffix aa
--java /usr/java/jdk1.7.0_25/bin/java
```

(2) Checking how data will be updated

Database Synchronizer outputs messages of data differences and inserting, updating and deleting data to the standard output. But no messages for same data stored in each database are output. The formats of these messages are below. Variables are underlined.

[Differences]

```
DIFFER;table_name,data_cat_label:masterdb;record_data_or_nonexistent
DIFFER;table_name,data_cat_label:slavedb;record_data_or_nonexistent
```

[Updating, inserting, deleting]

```
UPDATE;table_name,data_cat_label:master_or_slave_db;record_data
INSERT;table_name,data_cat_label:master_or_slave_db;record_data
DELETE;table_name,data_cat_label:master_or_slave_db;record_data
```

[The definitions of variables]

table_name; a table name in processing

data_cat_label; a label of the processing data category, listed below.

Table 5-2 Labels of data categories

category	label
A1a	expedition-data-exp-indistinguishable
A1b	expedition-data
A1b1	vcd-selectee-except-basic-and-defunct-in-masterdb
A2a	exp-site-hole-core
A2b	curatorial-material-data
B1	master-data
B2	master-data-editable
B2a	master-data-sequence-current-value

category	label
C	stray-data

master_or_slave_db; the database which have updating data originally. For updating and inserting, the master database when splitting, and the slave database when merging. For deleting, the slave database when splitting, and the master database when merging.

record_data_or_nonexistent; record_data or the string, "nonexistent" which means no record exist. The "nonexistent" would appear only when the processing table is a child table.

record_data; column values to update with. Column values which are not updated are not displayed. A null value would be output as the string "null." A line code in a column value would begin a new line with a tab code on its head. (Each "\n" and "\r" leads one new line, excepting a pair of "\r\n", which leads one new line.)

Database Synchronizer also outputs messages of creating/dropping Oracle users, and granting/revoking roles. The formats of these messages are below. Variables are underlined:

[Creating, dropping a user]

```
date CREATE-ORACLE-USER;data_cat_label:master_or_slave_db;user…result
date DROP-ORACLE-USER;data_cat_label:master_or_slave_db;user…result
```

[Granting, revoking a role]

```
date GRANT-ORACLE-ROLE;data_cat_label:master_or_slave_db;user,role…result
date REVOKE-ORACLE-ROLE;data_cat_label:master_or_slave_db;user,role…result
```

[The definitions of variables]

date; processed date. The format is yyyy-mm-ddThh:mm:ss.sssZ.

data_cat_label; a label of data category. For creating and deleting user, it is the string "master-data-editable." For granting and revoking a role, when the role belongs to an expedition, the string "expedition-data," when the role does not belong to an expedition, the string "master-data-editable."

master_or_slave_db; the database to be updated, the slave database when splitting, and the master database when merging.

user; an Oracle user id to be processed, with a suffix like "#z2."

role; an Oracle role to grant or to revoke.

result; a result of processing. In the go-live mode, it is "Succeeded" or "Failed." In the

dry-run mode, "`Skipped`," since SQLs to process these tasks are not published.

(3) Recognizing errors

Database Synchronizer outputs messages to the standard error output when an error occurs. To know what errors occurred and why they occurred, see the error messages. For the list of errors and their messages, refer to Appendix D. And to solve an error, editing database may be needed following Appendix D.

5.5. Usages of the related commands

5.5.1. The cleanup command

(1) Basic behavior

The cleanup command processes the following tasks for every specified database as arguments.

- Unlock all users excluding the user, jcores.
- Close existent sessions of the user, jcores.

(2) Synopsis

```
jcores-dbsync-cleanup [--forcible | --interactive] \
[--java java-command] \
password-for-user-jcores@hostname-or-ip-address:port:instance [...]
```

(3) Options and arguments

The options can be specified in random order.

`[--forcible | --interactive]`

The `--forcible` option closes the sessions of jcores forcibly. The `--interactive` option gives a prompt before closing the sessions. The default is `-- interactive`.

`[--java java-command]`

Specify the java command to use to execute. Its version must be 1.7. By default, the java command found on user path will be used.

`password-for-user-jcores@hostname-or-ip-address:port:instance [ ...]`

Specify the information to connect the databases to be cleaned up. You can specify as many databases as you want separating by a blank.

(4) Return codes and message outputs

The cleanup command returns a code after processing. The meanings of the codes are below:

Table 5-3 Return codes of the cleanup command

Status	Code	Situation
Success	0	Succeeded cleaning up for all of specified databases. No error has occurred.
Failed to start java command	1	Can't find jar file for command execution, jar file was destroyed, or illegal CLASSPATH, etc.
Failed to clean up	11	Cleaning up for some (or all) databases failed.
Can't find java command	20	Specified java command is not found, or installed directory is not included in PATH, etc.
Command format error	21	Required parameter was not specified, illegal command format, or unexpected option was specified, etc.
Runtime error	99	Serious runtime error has occurred.

The cleanup command outputs processing messages to the standard output, and error messages to the standard error output. To know detailed results of processing, or to know causes of errors, refer to these messages. For the list of errors and their messages, refer to Appendix D.

(5) Execution example

```
jcores-dbsync-cleanup --forcible --java /bin/usr/java \
foo@j-cores.yes.jamstec.go.jp:1521:honban \
baa@j-cores.yes.jamstec.go.jp:1521:ship
```

5.5.2. A password generator

(1) Basic behavior of a password generator

A password generator is a command which outputs a string to the standard output as a password of specified user. Database Synchronizer calls this command at beginning to confirm execution, and calls when creating a user.

A password generator is exchangeable. A generator to be used shall perform as below:

- A created password shall consist of only alphanumeric characters, “_”, “$”, and

"#."

- The last argument for the command is an Oracle user id, of which a password is created.
- If errors occur, no message is output to the standard output.
- If errors occur, error messages indicating causes are output to the standard error output.
- The command exits with status 0 if a password is created successfully, non-zero if errors occur.

(2) The password generator of version 1.3

A password generator, jcores-dbsync-pgen.sh is bundled in J-CORES version 1.3. This generator satisfies the behaviors written in 5.3.1(1).

The password generator outputs a string which connected a specified user name and a specified suffix, e.g. when a suffix is "`_suffix`", a password for a user "`uname`" is "`uname_suffix`."

[Synopsis]

`jcores-dbsync-pgen.sh --suffix passwd-suffix userid`

[Option]

The options shall be specified in the fixed order.

`--suffix passwd-suffix`; Specify a string to be used as a password suffix. The argument, `passwd_suffix` shall consist of only alphanumeric characters, "_", "$", and "#."

`userid`; Specify a Oracle user id, whose password will be created.

[Errors]

The password generator outputs error messages to the standard error output. For the list of errors and their messages, refer to Appendix D.

[Execution example]

This is an example to execute from a command line, specifying all arguments.

```
jcores-dbsync-pgen.sh --suffix _tmp "taro#z2"
```

This is an example to specify as an argument of the "--password-generator" option.

```
jcores-dbsync-pgen.sh --suffix _tmp
```

6. Properties

Database Synchronizer employs the property mechanism of Java, same as J-CORES client applications. You can change some values which influence on behaviors of Database Synchronizer by editing its property file. The property file is "`properties/dbsync.properties`" in the installed directory of Database Synchronizer. The editable values are below:

`default_password`; default password to use when creating an Oracle user. This password would be used when password generating failed.

`retry_time_second`; seconds to wait retrying to connect. When the database session had closed unexpectedly, Database Synchronizer would try to reconnect to unlock users on the database.

`retry_time_count`; the maximum counts to retry to connect to the session closed database.

7. Known Bug

Known but unfixed bug is shown below.

bug	how to avoid the bug
Conflicting records on `od21_mscl_calibration` table will become cause of merging / splitting failure even if `` `--masterdb-overwrites-conflict' `` or `` `--slavedb-overwrites-conflict' `` is specified. This bug will be occurred when a MSCL calibration file in both databases has same datetime.	Following steps resolve this bug. 1. Check standard error output and find conflicting records. 2. Update datetime on overwritten record (record on slavedb if `` `--masterdb-overwrites-conflict' ``). 3. Execute merge / split again. 4. Update `od21_mscl_run` records on merged / split database which refer to record updated on step 2 to refer to another record found on step 1. 5. Delete `od21_mscl_calibration` record on merged / split database which was updated on step 2. 6. Update to restore datetime of `od21_mscl_calibration` record which was updated step 2, if the updated record is on the source database (master database when splitting, and slave database when marging).